



Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

SUCCESS STORY

AFRL DEMONSTRATES SENSORCRAFT WING MODEL



Future intelligence, surveillance, and reconnaissance platforms, such as the SensorCraft, require thinner, higher-aspect-ratio wings for reduced air vehicle weight, improved performance, and increased ability to remain on station for longer periods of time.



Air Force Research Laboratory
Wright-Patterson AFB OH

Accomplishment

AFRL, Northrop Grumman, and the National Aeronautics and Space Administration (NASA) teamed on the High-Lift-Over-Drag Active (HiLDA) Wing program to successfully demonstrate a 12% scaled model of a highly elastic SensorCraft concept wing. During a series of wind tunnel tests at NASA's Transonic Dynamics Tunnel, scientists subjected this wing to events characteristic of a steady, smooth flight environment, as well as events (e.g., erratic wind gusts) more typical of extreme conditions. These tests allowed AFRL engineers to reduce the structural loads caused by gusts by a factor of two.

During the steady flight conditions, scientists successfully reduced the wing's drag by making slow, deliberate adjustments to the wing's control surfaces to maximize its lift-to-drag ratio. During the gusty conditions, scientists successfully alleviated the wing's structural loads by continuously making small adjustments to the control surfaces. In the future, this ability to make adjustments enabling a much lighter wing structure to endure strong wind gusts will increase the SensorCraft's capabilities and enable it to remain on station longer.

Background

AFRL is developing air vehicle technologies and vehicle concepts to enable a future intelligence, surveillance, and reconnaissance capability. In support of the SensorCraft concept, the HiLDA Wing program evaluated active wing technologies, including active flow control, adaptive structure, and active aeroelastic wing (AAW) technologies. During this specific effort, scientists studied the response of a highly flexible SensorCraft wing to steady and unsteady aerodynamic loads.

Additional Information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (VA-S-05-30)

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